

NON-PUBLIC?: N
ACCESSION #: 9106200189
LICENSEE EVENT REPORT (LER)

FACILITY NAME: LaSalle County Station Unit 1 PAGE: 1 OF 3

DOCKET NUMBER: 05000373

TITLE: Reactor Scram On Low Reactor Vessel Water Level Due To Loss Of
'A' Turbine Driven Reactor Feedwater Pump Caused By Control Valve
Closure

EVENT DATE: 05/19/91 LER #: 91-006-00 REPORT DATE: 06/17/91

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: 1 POWER LEVEL: 080

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR
SECTION:
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:

NAME: Harold T. Vinyard, Technical Staff TELEPHONE: (815) 357-6761
Engineer, Extension 2499

COMPONENT FAILURE DESCRIPTION:

CAUSE: X SYSTEM: JK COMPONENT: MANUFACTURER:
REPORTABLE NPRDS: N

SUPPLEMENTAL REPORT EXPECTED: No

ABSTRACT:

On May 19, 1991 at 0423 hours, with Unit 1 in Operational Condition 1 (Run) at 80% power (steady-state) and both Turbine Driven Reactor Feed Pumps (TDRFP) in three-element automatic control, the "A" TDRFP discharge flow decreased from 5.5 MLB/hr to 0.1 MLB/hr initiating a decrease in reactor water level.

Approximately three seconds after the loss of the "A" TDRFP flow, a reactor low level alarm annunciated. The licensed unit Reactor Operator (RO) immediately responded to the alarm and diagnosed the problem as loss of "A" TDRFP flow. The Operator placed the "A" TDRFP controller under manual control and attempted to manually increase flow. The "A" TDRFP failed to respond and since the "B" TDRFP could not turn the level decrease by itself the reactor scrambled at Level 3 (+12.5" reactor water

level). All Reactor Protection actuations occurred as expected. There were no Emergency Core Cooling System (ECCS) or Primary Containment Isolation System actuations. The unit was placed in Hot Shutdown following the scram.

The cause of this event was the "A" TDRFP control valve spontaneously closing, effectively disabling the "A" feedwater turbine and pump flow control. The root cause for this closure is not known. After extensive "A" TDRFP testing, Unit 1 was restarted on May 21, 1991 and no problems have occurred since that time.

This event is being reported pursuant to 10CFR50.73(a)(2)(iv) due to the actuation of an Engineered Safety Feature System.

END OF ABSTRACT

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PLANT AND SYSTEM IDENTIFICATION

General Electric - Boiling Water Reactor

Energy Industry Identification System (EIIS) codes are identified in the text as XX!.

A. CONDITION PRIOR TO EVENT

Unit(s): 1 Event Date: 5/19/91 Event Time: 0423 Hours

Reactor Mode(s): 1 Mode(s) Name: Run Power Level(s): 80%

B. DESCRIPTION OF EVENT

On May 19, 1991 at 0423 hours, with Unit 1 in Operational Condition 1 (Run) at 80% power (steady-state) and both Turbine Driven Reactor Feed Pumps (TDRFP) (FW) JK! in three-element automatic control, the "A" TDRFP discharge flow decreased from 5.5 MLB/hr to 0.1 MLB/hr. The "B" TDRFP increased from 5.5 MLB/hr to 6.3 MLB/hr. This increase in flow was not demanded by the Reactor Water Level Control System (RWLC) (RL) JB!, but was the result of the decrease in total feedwater flow (FW) SJ! which created a higher feedpump suction pressure and lower pressure losses across the associated piping and components. Total Main Steam (MS) SB! flow remained constant during the decrease in total feedflow. Due to this mismatch in flows, the reactor water level began decreasing at approximately 1.0

inch per second.

Approximately three seconds after the loss of the "A" TDRFP, a reactor low level alarm (Level 4, +31.5" reactor water level) annunciated. The licensed unit Reactor Operator (RO) immediately responded to the alarm and diagnosed the problem as loss of "A" TDRFP flow. By this time, the RWLC system had recognized the level error and began increasing the "B" TDRFP flow to compensate. The Operator placed the "A" TDRFP controller under manual control and attempted to manually increase flow. The "A" TDRFP failed to respond and since the "B" could not turn the level decrease by itself the reactor scrammed at Level 3 (+12.5" reactor water level). All Reactor Protection (RP) JC! actuations occurred as expected. There were no Emergency Core Cooling System (ECCS) or Primary Containment Isolation System (PCIS) (PC) JM! actuations (no valve movement). The unit was placed in Hot Shutdown following the scram.

There were no other systems or components inoperable at the time of the event that contributed to this event.

This event is reportable pursuant to the requirement of 10CFR50.73(a)(2)(iv) due to the automatic actuation of the Reactor Protection System.

C. APPARENT CAUSE OF EVENT

The cause of this event was the "A" TDRFP control valve spontaneously closing, effectively disabling the "A" feedwater turbine and pump flow control. The root cause for this closure is not known. Post scram investigation indicated the signal to the "A" TDRFP from the M/A transfer station was increasing throughout the event. An increasing signal would demand increasing feedpump turbine speed and more feedwater flow. The M/A transfer station output signal to the "A" TDRFP was evaluated by the system engineer as acceptable based on the operating configuration of the feedwater system during the transient.

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C. APPARENT CAUSE OF EVENT CONTINUED

Investigation of the turbine hydraulic controls with the turbine manufacturer (General Electric) representative revealed no reason for the failure of the turbine controls. Speculation is that a particle in the hydraulic control oil may have momentarily plugged a control valve oil port, which would fail-close the valve.

D. SAFETY ANALYSIS OF EVENT

Loss of total feedwater flow with the reactor at 104.8% power is analyzed as a moderate frequency transient in Section 15.2.7 of the Updated Final Safety Analysis Report. Because this event involved a partial loss of feedwater flow control, its consequences are bounded by the UFSAR analysis. No additional failures or initial conditions existed which would challenge the expected results of the UFSAR analysis. Operator actions to decrease reactor power were partially effective (by delaying the trip) but could not prevent the eventual trip on low level. The core instability region was not entered at any time during this event. Reactor water level 2 (-50" reactor water level) was not reached due to the loss of only one feedpump and the reactor being at 80% power at the initiation of the transient. There were minimal safety consequences for this event since the plant responded to the partial loss of feedwater flow as expected.

E. CORRECTIVE ACTIONS

An analysis of the data from the transient recorder revealed the reactor water level control system responded adequately to the transient. The "A" TDRFP control valve, however, did not respond to its electrical demand signal and remained closed. The "A" feedpump turbine hydraulic controls were inspected by a General Electric representative and no problems were found. The "A" TDRFP control valve was successfully cycled repeatedly following this event. Additional data points were added to the transient recorder via Temporary System Change 1-1014-91 to aid in any future investigations should this problem re-occur. Unit I was restarted on May 21, 1991 and no problems have occurred since that time.

F. PREVIOUS EVENTS

LER Number Title

373/87-022-00 Reactor Scram Due To Failure Of Turbine Driven Reactor Feed Pump Control Valve.

G. COMPONENT FAILURE DATA

No component failed in this event.

Commonwealth Edison
LaSalle County Nuclear Station
Rural Route #1, Box 220
Marseilles, Illinois 61341
Telephone 815/357-6761

June 17, 1991

Director of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Mail Station P1-137
Washington, D.C. 20555

Dear Sir:

Licensee Event Report #91-006-00, Docket #050-373 is being submitted to your office in accordance with 10CFR50.73(a)(2)(iv).

G. J. Diederich
Station Manager
LaSalle County Station

GJD/HTV/cas

Enclosure

xc: Nuclear Licensing Administrator
NRC Resident Inspector
NRC Region III Administrator
INPO - Records Center
IDNS Resident Inspector

*** END OF DOCUMENT ***
